



Data Strategies, Session 2, December 10, 2001

Data Strategies For Improved Learning



**Disaggregation:
How to Enjoy
a Breakdown**

By Mike Chapman, OPI Measurement and Accountability December 10, 2001

Office of Public Instruction, Linda McCulloch, Superintendent



Some Topics for Today

- Sources of data at OPI
 - The OPI website, current and future
 - Examples of assessment data from the web
 - Requesting data from Measurement and Accountability
- Other data sources
 - The NCES website
 - US Census website



Some More Topics for Today

- Discussion of graphing techniques (brief)
- Questions and graph types
- Educational synectics



Workshop Participants Will:

- Be able to identify major topics in Bernhardt's *Data Analysis for Comprehensive School Improvement*
- Know how to order a copy of these slides from Measurement and Accountability
- Be able to find statewide assessment and other data on OPI's website



- Be forced to stay awake for at least two hours, as measured by OPI facilitators (we'll be watching...)



Sources of Information: OPI

- Web Resources and Publications
- Data Requests to Measurement and Accountability
- Technical Assistance
- Website enhancements



Finding the OPI Web Page

Finding the assessment data

OPI's URL (for now – soon to change): www.MetNet.mt.us

Address <http://www.netnet.state.mt.us/> Go Links

Montana Office of Public Instruction **OPI**
Log On Join Help FAQ Search Jobs
Welcome! Local Search

The Montana Office of Public Instruction, [Linda McCulloch, Superintendent](#) • P.O. Box 202501 Helena, Montana 59620-2501 • In-State Toll-Free 1-800-231-6393, Local (406) 444-3600
Last Modified: Sunday, November 16, 2001 at 12:33:16 PM

Spring 2001 Statewide Test Results, Including Scores for Individual Schools, are now available!

2001-2002 Montana School Directory

The Montana School Directory for the school year 2001-2002 is now available for download and are being shipped to Montana schools! Additional copies may be purchased for \$8.70 S&H from:

Advanced Litho Printing
226 9th Ave. South
Great Falls, Montana 59405-4034
(406) 453-0393 FAX (406) 454-4034

Montana School Law Order Form

Every biennium, the Superintendent of Public Instruction publishes a compilation of Montana statutory law affecting public schools. The 2001 Montana School Laws should be back from the printers and ready for

Electronic Reporting Systems

Search our Web site
Enter some key words to search by:

Find pages with of these words.

[Advanced Search](#) [Alternate search tools](#)
Get [information](#) about pages indexed.

Programs & Services of OPI

[Information about the Office of Public Instruction](#)



Finding the M&A Web Page

M&A's URL:

<http://www.metnet.state.mt.us/MeasurementAcctability/htm/>

Address <http://www.metnet.state.mt.us/MeasurementAcctability/htm/>

Montana Office of Public Instruction **OPI**

Log On Join Help FAQ Search Jobs

Measurement & Accountability Local Search

Last Modified: Tue, 01 May 2001 14:05:44

The Measurement and Accountability unit is responsible for the coordination of non-fiscal data collections to assure coordinated application of policy, appropriate interpretation of reporting requirements, comparability of data, and communication of data analysis to school districts, OPI management and staff.

Areas of responsibility include:

- [Statewide Student Assessment](#)
- [School Enrollment Overview](#)
- [Montana Statewide Education Profile](#)
- [Dropout Rates](#)
- [Montana College Readiness Test Scores 2000](#)
- Non-public School Enrollment
- Federal Reports to National Center for Education Statistics (NCES)
- National Assessment of Educational Progress (NAEP)
- Census Map School District Boundaries

Division of.....

Measurement & Accountability

[Statewide Student Assessment](#)

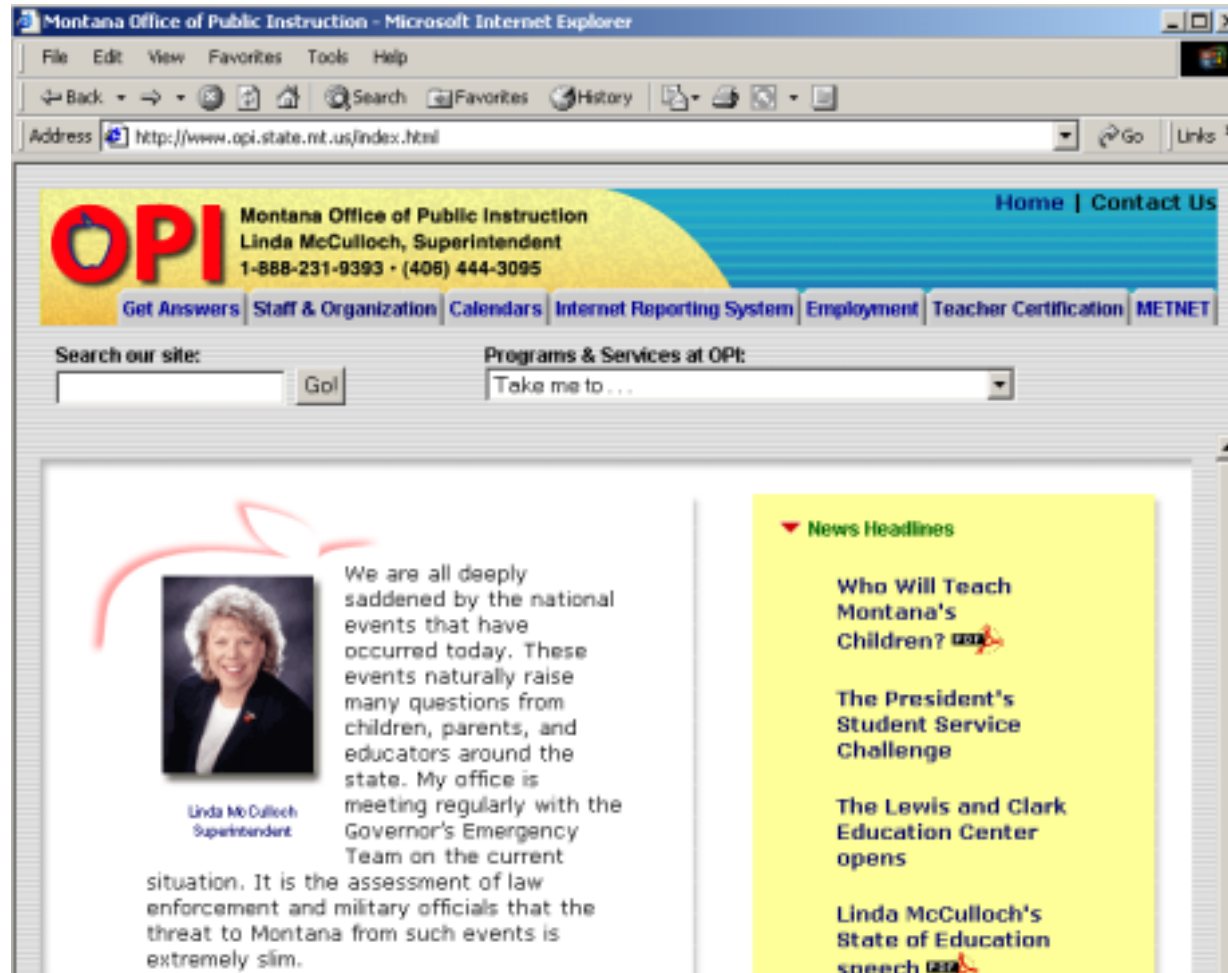
[Staff Recruitment and Retention Report](#)

[Small Schools Self-Evaluation Guide](#)



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Coming soon: a new, improved OPI website
<http://www.opi.state.mt.us/index.html>



Web Resources



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Finding the 2001 Assessment Summary Data



Montana Comprehensive Assessment System
Phase I
Spring Administration of the Iowa Tests

NEW! Results of Spring 2001 Statewide Norm-Referenced Test



Administrative Rules of Montana Relating to Statewide Student Assessment

Authorizing Legislation for Statewide Student Assessment

- Board of Public Education
- State Superintendent of Public Instruction

Selecting this puts you into the **summary data** for schools and systems, rather than the breakout by racial/ethnic origin or other disaggregations.

Web Resources



Finding the 2001 Disaggregated Data - 1

Make sure to click the **Enable Macros** button to run. This spreadsheet has been scanned with the latest virus definition files.



Whole State Disaggregations



Whole State Disaggregations by District Size Category

School and System Disaggregations by County



Interpretive Guide for ITBS/ITED

Selecting this puts you into the disaggregated data for schools and systems farther down the page.



Finding the 2001 Disaggregated Data - 2

These are all in Portable Document format (pdf) and contain disaggregations for all county *systems* and *schools*. They are presented by county for ease of finding a particular system or school.

County	System	School
Beaverhead	Assess2001SystemCty01.pdf	Assess2001SchoolCty01.pdf
Big Horn	Assess2001SystemCty02.pdf	Assess2001SchoolCty02.pdf
Blaine	Assess2001SystemCty03.pdf	Assess2001SchoolCty03.pdf
Broadwater	Assess2001SystemCty04.pdf	Assess2001SchoolCty04.pdf
Carbon	Assess2001SystemCty05.pdf	Assess2001SchoolCty05.pdf



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A whole-page (unreadable) view of one school's disaggregated data

Montana Norm-referenced Statewide Assessment 2000-2001			Count of students in performance category					Percent of students in performance category					
Grade	Subject Area	Grouping		Total	Novice	Nearing Proficient	Advanced		Novice	Nearing Proficient	Advanced	NCE	NPR
School system: 0221 Chinook Public Schools			County:	03	Blaine				CO: 03			LE: 0028	
Montana Norm-referenced StatewideAssessment School Year 2000-2001 By School													
Grades 4 and 8, ITBS, Form A -- Grade 11, ITED, Form A													
School: 1798 Chinook 7-8				Count of students in performance category				Percent of students in performance category					
Grade	Subject Area	Grouping		Total	Novice	Nearing Proficient	Advanced		Novice	Nearing Proficient	Advanced	NCE	NPR
Disaggregation: All Students Combined													
0008	READING		RD	30	3	6	17	4	10%	20%	57%	13%	55 60
0008	MATH		MA	30	3	6	18	3	10%	20%	60%	10%	52 54
0008	LANGUAGE ARTS		LA	30	4	6	16	4	13%	20%	53%	13%	52 54
0008	SCIENCE		SC	30	3	2	18	7	10%	7%	60%	23%	58 64
0008	SOCIAL STUDIES		SS	30	5	4	16	5	17%	13%	53%	17%	58 65
Disaggregation: Students Without Disabilities													
0008	READING		RD	26	1	5	16	4	4%	19%	62%	15%	59 66
0008	MATH		MA	26	1	4	18	3	4%	15%	69%	12%	55 59
0008	LANGUAGE ARTS		LA	26	2	4	16	4	8%	15%	62%	15%	54 58
0008	SCIENCE		SC	26	2	2	15	7	8%	8%	58%	27%	60 68
0008	SOCIAL STUDIES		SS	26	4	4	13	5	15%	15%	50%	19%	59 67
Disaggregation: Students With Disabilities													
0008	READING		RD	4	*	*	*	*	*	*	*	*	*
0008	MATH		MA	4	*	*	*	*	*	*	*	*	*
0008	LANGUAGE ARTS		LA	4	*	*	*	*	*	*	*	*	*
0008	SCIENCE		SC	4	*	*	*	*	*	*	*	*	*
0008	SOCIAL STUDIES		SS	4	*	*	*	*	*	*	*	*	*
Disaggregation: Gender													
0008	READING	F	RD	15	1	2	8	4	7%	13%	53%	27%	62 72
0008	READING	M	RD	15	2	4	9	0	13%	27%	60%	0%	51 51
0008	MATH	F	MA	15	0	2	10	3	0%	13%	67%	20%	60 68
0008	MATH	M	MA	15	3	4	8	0	20%	27%	53%	0%	44 39

Printed: Friday, November 02, 2001

* Results not shown to protect student privacy

Report: rptSchoolDisaggregations

Page 7 of 36

Note 1: Testing data for school year 2000-2001 establishes a new baseline for Montana assessment, reporting the results of a new test (ITBS/ITED Form A, normed against a national sample population in school year 2000) administered uniformly across the state for the first time. These test scores therefore cannot be compared to results from prior years in a statistically valid way.

Note 2: The absence of one or more disaggregation category, such as Students With Disabilities, means that no students were tested who belonged to that category.

Web Resources



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A closer view of some salient detail

Montana Norm-referenced Statewide Assessment 2000-2001

Count of students

Grade

Subject Area

Grouping

Total

Novice

School system: 0221 Chinook Public Schools

County: 03 Blaine

Grade

Subject Area

Grouping

Disaggregation: All Students Combined

0008

READING

RD

0008

MATH

MA

0008

LANGUAGE ARTS

LA

Disaggregation: Racial/Ethnic Origin

0008

READING

American Indian/Alaskan Native

RD

0008

READING

Hispanic or Latino

RD

0008

READING

White, Non-Hispanic

RD

0008

MATH

American Indian/Alaskan Native

MA

0008

MATH

Hispanic or Latino

MA

0008

MATH

White, Non-Hispanic

MA

Etc...

Web Resources



More salient detail

Percent of students in performance category
Novice Nearing Proficient Advanced

10%	20%	57%	13%
10%	20%	60%	10%
13%	20%	53%	13%
10%	7%	60%	23%
17%	13%	53%	17%

NCE NPR

55	60
52	54
52	54
58	64
58	65



Data Requests to Measurement and Accountability

- Provide ad hoc data for specific needs, e.g., grant proposals, OPI or other state agency needs
- Number over 100 per year
- Normally require over two hours to produce



Data Requests to Measurement and Accountability – Data Formats

- MS Access 2000, also 97
- MS Excel
- Text
- HTML



Data Requests to Measurement and Accountability - Considerations

- We prefer e-mail to open the discussion to create an e-paper e-trail (e-gad!).
- Please include a phone number, since many requests require clarification.
- Please exhaust your local resources before calling.
- Please give us as much lead time as possible.



Measurement and Accountability Staff Members

- Mike Chapman, 444-4527, Rsch & Analysis
Mgr mchapman@state.mt.us
- Vicki Thacker, 444-6712, Data Specialist,
vthacker@state.mt.us
- To Be Hired (Soon, we hope)
- Lindy Miller, 444-6774, Administrative
Assistant, lindmiller@state.mt.us



Technical Assistance From Measurement and Accountability

- Limited due to staff workloads
- Nuts and bolts, rather than policy-oriented



Still to Come:

Disaggregated Data in Excel

- Two types of assessment data, SUMMARY and DISAGGREGATED.
- Summary spreadsheets have 1,000 rows for school-level and 700 for system-level data.
- Disaggregated Access tables have 38,000 rows for school-level and 31,000 for system-level data.



Still to Come:

Disaggregated Data in Excel

- Any grouping with less than 6 students can't be published for reasons of student privacy (just like the disaggregated pdf reports).
- We will probably publish school-level and system-level data by county, just like the pdf reports, and as soon as practicable.



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Sources of Information: NCES <http://nces.ed.gov/>

Address <http://nces.ed.gov/>

Welcome to the
National Center for Education Statistics

NewsFlash
Sign Up
Now!

NCES is the primary federal entity for collecting and analyzing data that are related to education in the United States and other nations.

----- Visit Popular NCES Sites -----

Headlines

- [Read Secretary Paige's & Deputy Commissioner Phillips' Remarks and See Video Clips on PISA Release](#)
- [Read the Highlights From the 2000 Program for International Student Assessment \(PISA\)](#)

Inside the Stats! (Archive)

Average Reading Literacy Scores in the 2000 PISA Assessments for 15-year-olds:
U.S. 504
Finland 546
Mexico 422
OECD Average 500.
([Read Entire Article](#))

Navigation Links:

- Click on Book
- Help
- What's New?
- Electronic Catalog
- Students' Classroom
- Survey & Program Areas
- Encyclopedia of ED Stats**
- Quick Tables & Figures
- Search for Schools, Colleges, and Libraries
- NCES Fast Facts

Search NCES

NCES website



From the Encyclopedia of Ed Stats:

All of the 13 states in the West are expected to show increases in public school enrollment between 1999 and 2010. Increases are expected in Alaska (12 percent), Arizona (12 percent), California (5 percent), Colorado (6 percent), Hawaii (12 percent), Idaho (16 percent), **Montana (3 percent)**, Nevada (15 percent), New Mexico (14 percent), Oregon (1 percent), Utah (8 percent), Washington (3 percent), and Wyoming (8 percent).



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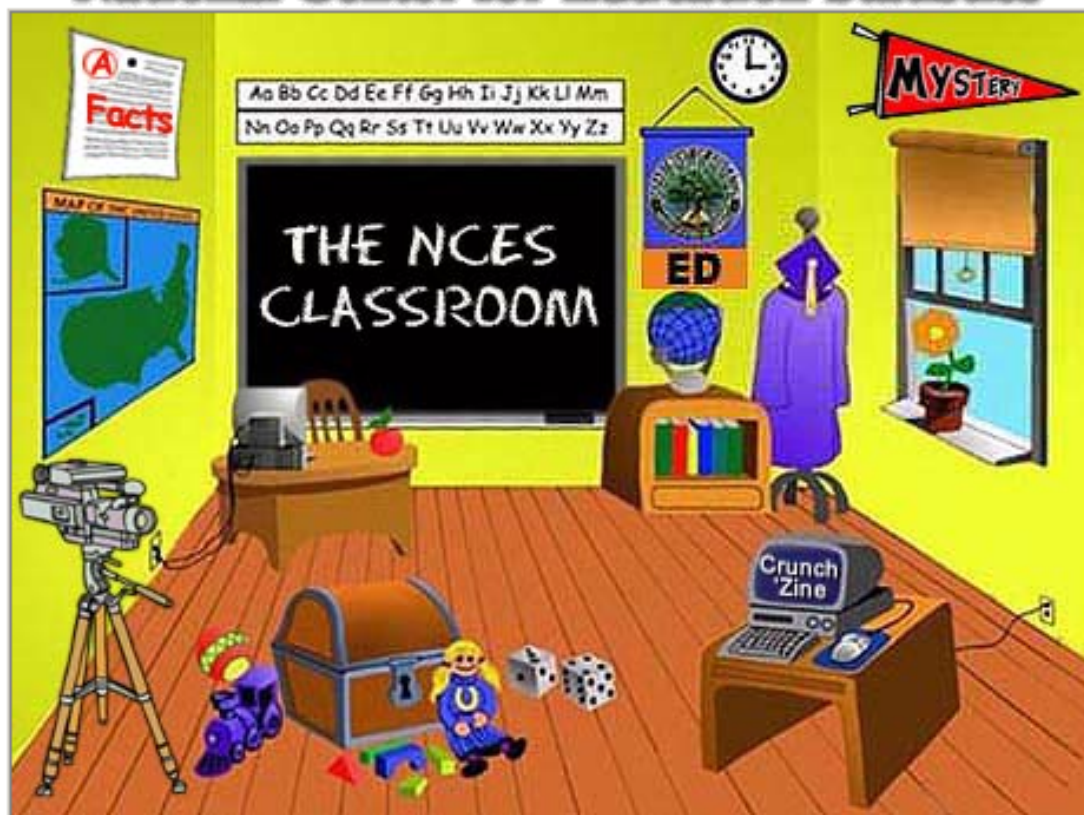
NCES website



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The NCES Student's Classroom

— National Center for Education Statistics —



Education information and activities for students everywhere!

Welcome to the NCES Students' Classroom, for kids and adults alike. Move your mouse over the images and watch the chalkboard to see what's available, or use the text links below.

NCES website



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One of the interactive features of the Student's Classroom



Check out all the choices on this page.



Mathematicians are People Too! Take a [Quiz](#) and find out which famous mathematician most interests you.



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One of the interactive features of the Student's Classroom

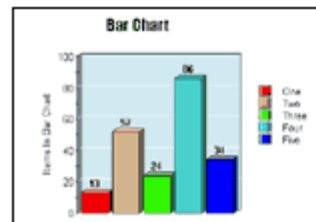
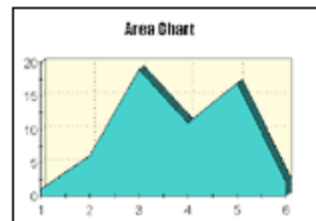
NCES's

Education Information for Students Across the Nation

Create a Graph

[Home](#) [Kids Site Map](#) [Glossary](#) [Help](#)

Have you heard the saying: "A picture is worth a thousand words"?



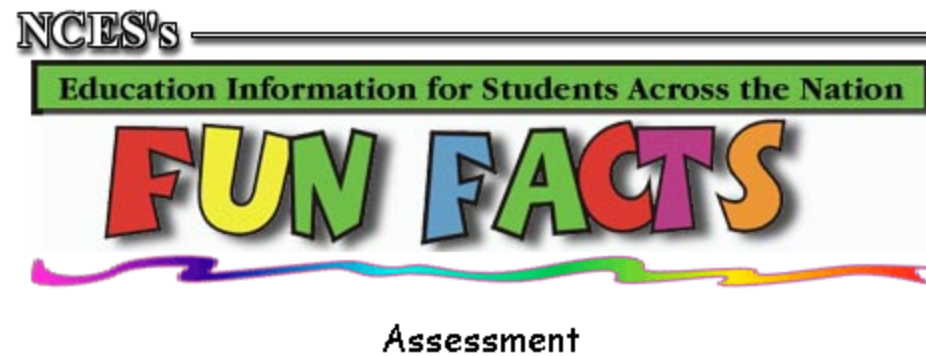
Line Chart

Graphs and charts are great because they communicate information visually. For this reason, graphs are often used in newspapers, magazines and businesses around the world. NCES constantly uses graphs and charts in our publications and on the web. Sometimes, complicated information is difficult to understand and needs an illustration. Other times, a graph or chart helps impress people by getting your point across quickly and visually. Here you will find four different graphs and charts for you to consider. Maybe it will help explain what you are trying to show. Use homework problems, things you have a special interest in, or use some of the numbers you find elsewhere on this site. Have fun!



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From the Student's Classroom – Fun Facts



Assessment Factoids:

Find "byte" size text Factoids by using the pull-down list above to find information in more specific Assessment topics.

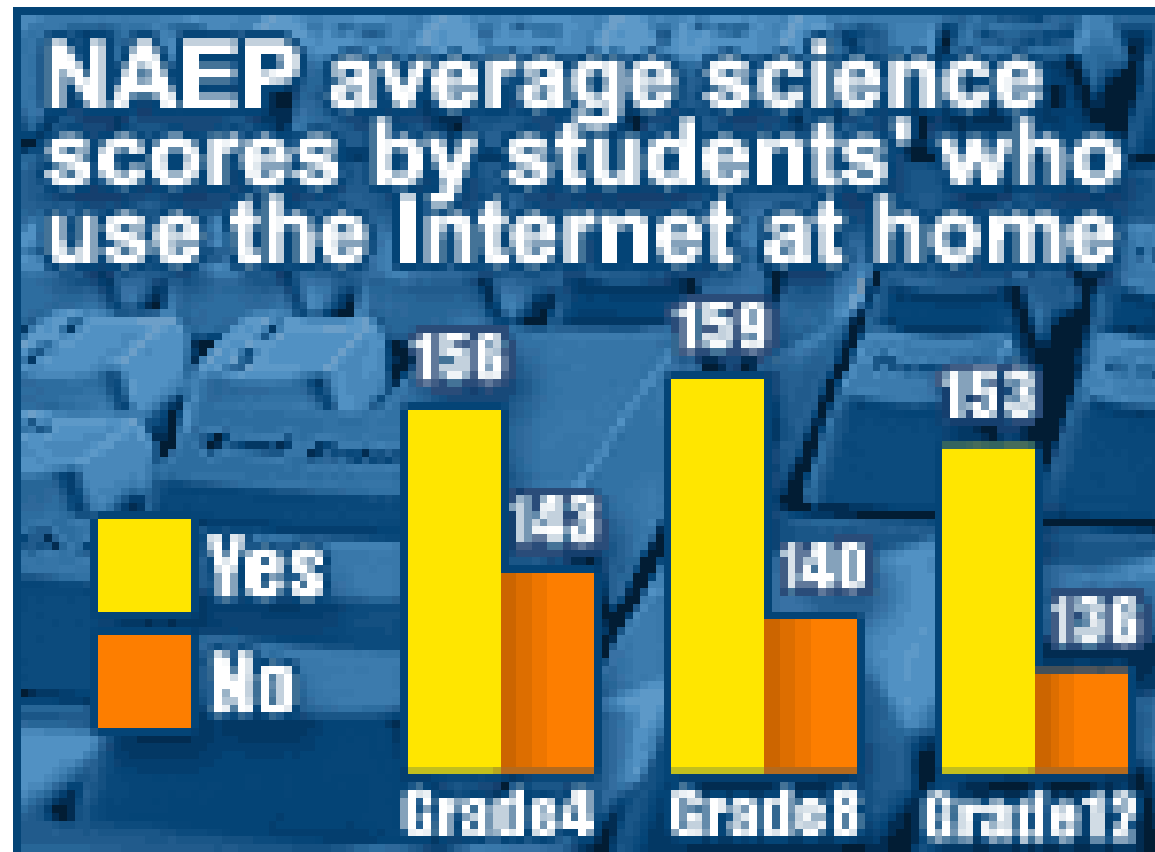


A Fun Fact: TV Watching And Achievement





A Fun Fact: Internet Use and Science Scores





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Search NCES

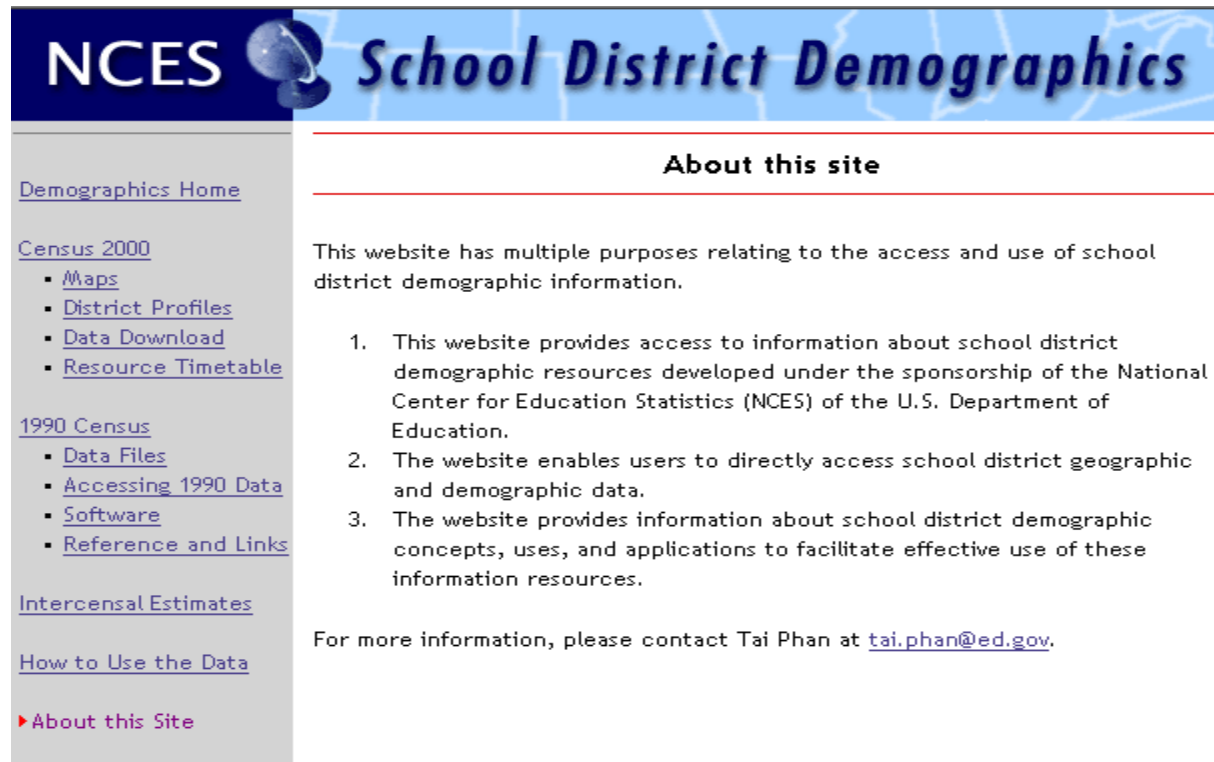
NCES website



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New NCES Site: Demographics

<http://nces.ed.gov/surveys/sdds/>



The screenshot shows the NCES School District Demographics website. The header features the NCES logo and the title "School District Demographics" in a blue banner. A left sidebar contains a navigation menu with links to "Demographics Home", "Census 2000" (with sub-links for Maps, District Profiles, Data Download, and Resource Timetable), "1990 Census" (with sub-links for Data Files, Accessing 1990 Data, Software, and Reference and Links), "Intercensal Estimates", "How to Use the Data", and "About this Site". The main content area is titled "About this site" and contains a paragraph stating the website's purpose and a numbered list of three points: 1. Access to school district demographic resources under NCES sponsorship. 2. Direct access to school district geographic and demographic data. 3. Information about school district demographic concepts, uses, and applications. At the bottom of the main content area, it provides contact information for Tai Phan at tai.phan@ed.gov. A footer bar at the very bottom contains links to NCES Home, Education Home, Search NCES, Electronic Catalog, Surveys & Programs, NCES Help, NCES NewsFlash, E-mail WebMaster, and an NCES Site Map icon.

NCES School District Demographics

About this site

This website has multiple purposes relating to the access and use of school district demographic information.

1. This website provides access to information about school district demographic resources developed under the sponsorship of the National Center for Education Statistics (NCES) of the U.S. Department of Education.
2. The website enables users to directly access school district geographic and demographic data.
3. The website provides information about school district demographic concepts, uses, and applications to facilitate effective use of these information resources.

For more information, please contact Tai Phan at tai.phan@ed.gov.

[Demographics Home](#)

[Census 2000](#)

- [Maps](#)
- [District Profiles](#)
- [Data Download](#)
- [Resource Timetable](#)

[1990 Census](#)

- [Data Files](#)
- [Accessing 1990 Data](#)
- [Software](#)
- [Reference and Links](#)

[Intercensal Estimates](#)

[How to Use the Data](#)

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NCES website



To get on the NCES eMailing list, go to:

<http://nces.ed.gov/newsflash>



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Some Notes on Creating Graphs

Graphs and graphing



Different Graph Types Answer Different Questions

- Pie or stacked bar chart for percentages or parts of wholes
(Bernhardt, p 37)
- Bar graph for relative magnitudes, e.g., numbers of students in groups
- X-Y graph to show interaction of two variables
(Bernhardt, Ch 5)
- Flow charts to map processes
(Bernhardt, p 103)



Graphing Disaggregated Data: Using Two Columns to Label the X-axis in Excel - 1

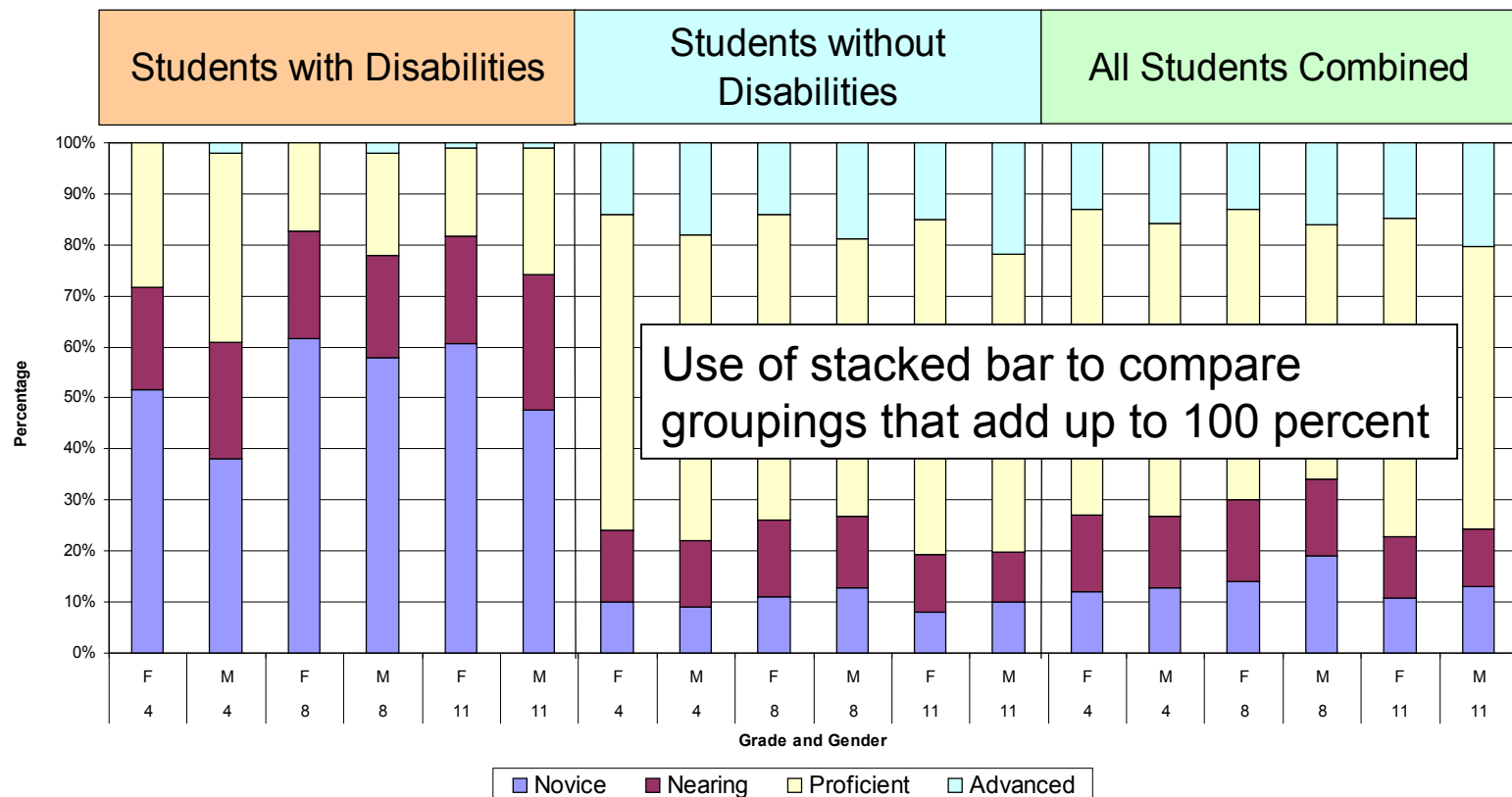
Select both of these columns for X-axis label to get the result shown on the next slide.

SubjectArea	ClassGrade	Gender	NceAvg
MATH	4	F	36
MATH	4	M	41
MATH	8	F	34
MATH	8	M	36
MATH	11	F	33
MATH	11	M	38
MATH	4	F	58
MATH	4	M	59
MATH	8	F	55
MATH	8	M	56
MATH	11	F	56
MATH	11	M	59



Using Two Columns to Label the X-axis in Excel - 2

**Graph of Percentages of Students in Four Stanine Groupings
as measured by ITBS Scores Spring 2000**

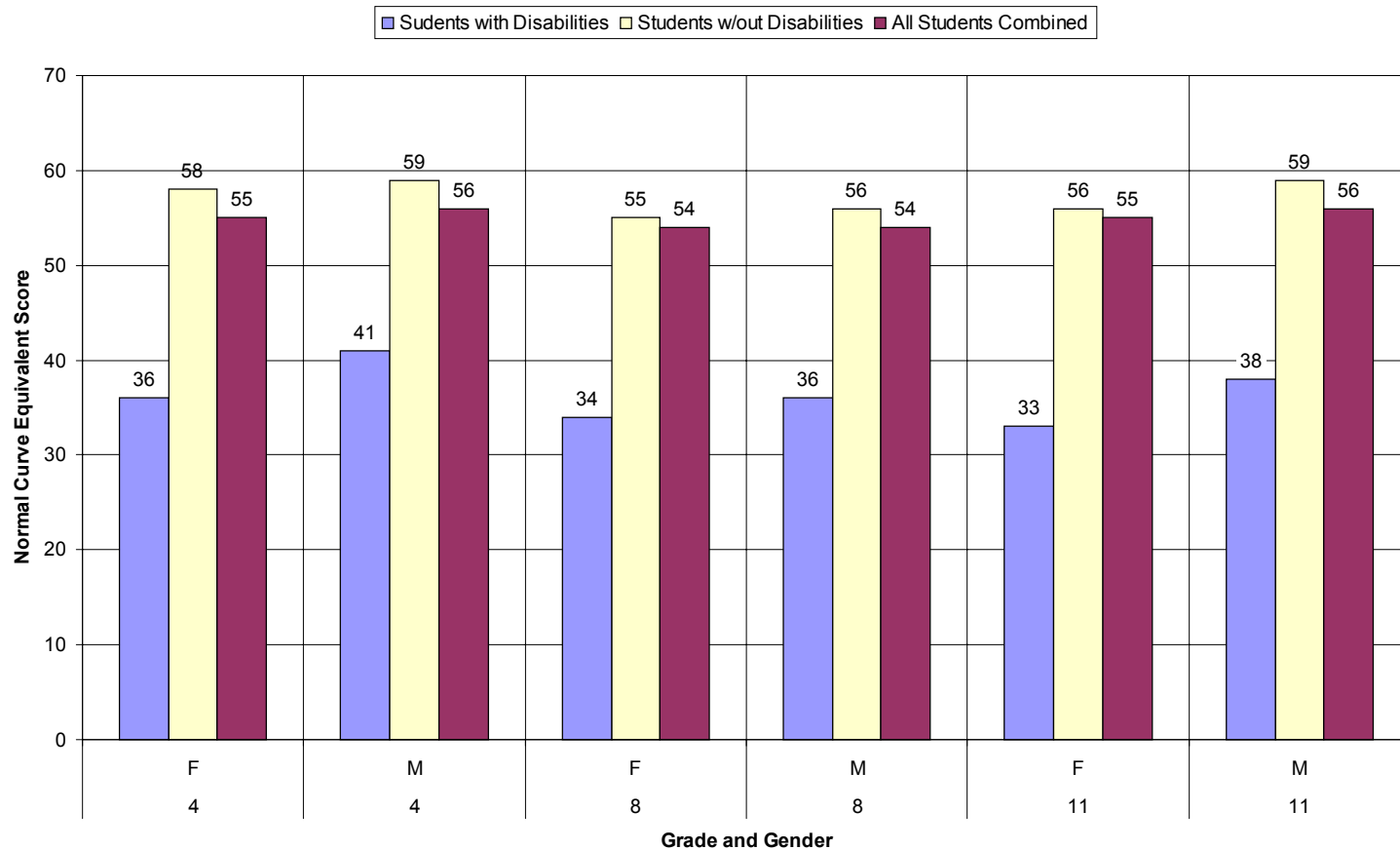




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A Bar Chart for Count Comparison

ITBS/ITED Math Scores for Montana Students With and Without Disabilities, Spring 2001



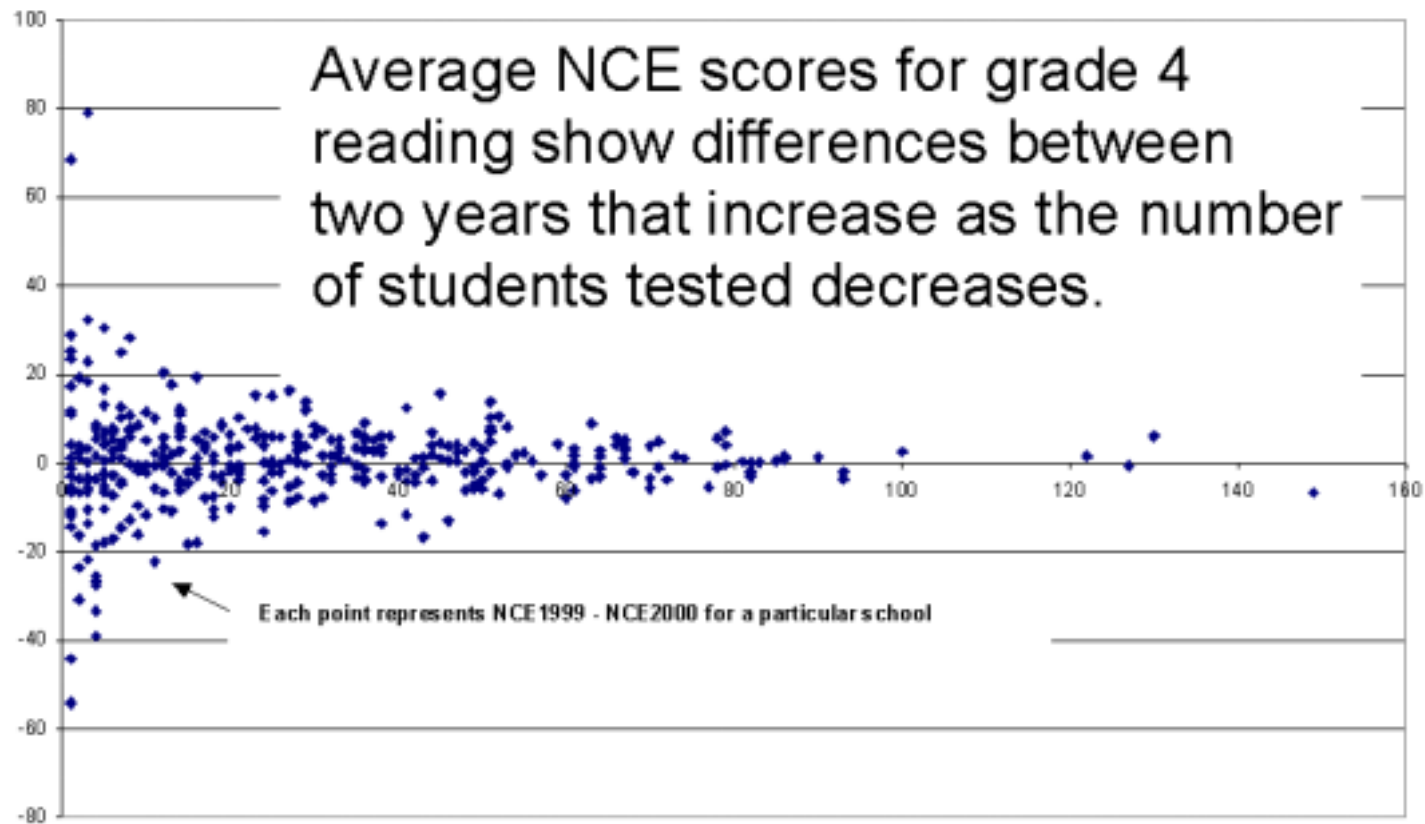
Graphs and graphing



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Using an X-Y Graph Type

**Graph of Total Number Tested vs Difference of Average NCE Scores
between School Years 1999 and 2000, Grade 4 Reading**





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Statewide Assessment Scoring Definitions and Characteristics

Source: OPI website -- *ITBS/MontCAS Interpretive Guide*

Graphs and graphing



Statewide Assessment Scoring Definitions and Characteristics

Raw Score

NRT Scores	Definition	Score Range	Characteristics	Uses	Example	Limitations
Raw Score (RS)	Number of test questions student answered correctly.	Number of items varies per test.	Can be used to calculate percent- correct.	Can be converted to other scores: SS, NS, NCE, NPR.	If Jesse's raw score on a 40-item test is 30, he answered 30 of the 40 items correctly.	Meaning varies from test to test.

Source: *ITBS/MontCAS Interpretive Guide*



Statewide Assessment Scoring Definitions and Characteristics

Standard Score

NRT Scores	Definition	Score Range	Characteristics	Uses	Example	Limitations
Standard Score (SS)	Equal- interval scale of scores that is continuous from kinder- garten to grade 12.	80–400	<ul style="list-style-type: none">• Shows year-to-year growth.• Median SS for each grade reflects typical student performance in that grade.	To measure achievement growth from year to year.	Sam is in eighth grade. His Reading Comprehension SS of 249 means that his reading level is like that of the typical eighth-grade student in March.	For interpretation of the SS, a benchmark value associated with typical performance in each grade is needed.

Source: *ITBS/MontCAS Interpretive Guide*



Statewide Assessment Scoring Definitions and Characteristics

National Percentile Rank

NRT Scores	Definition	Score Range	Characteristics	Uses	Example	Limitations
National Percentile Rank (NPR)	Percent of students in the national norm group who earned raw scores the same as or lower than a particular raw score.	1–99	<ul style="list-style-type: none">• Shows a student's relative positioning in a group of students in the same grade tested at the same time of year.• Frequency-based scale.	<ul style="list-style-type: none">• To describe student performance in small, fairly precise units relative to the norm group.• To describe areas of relative strength and weakness for an individual student, class, or grade group.	Lisa's NPR of 43 for Social Studies means that 43 percent of the national norm group scored at or below Lisa's raw score, and 57 percent scored higher.	NPRs cannot be averaged. Group averages must be reported in terms of other scores, such as the NPR of the average SS.

Source: *ITBS/MontCAS Interpretive Guide*



Statewide Assessment Scoring Definitions and Characteristics

National Stanine

NRT Scores	Definition	Score Range	Characteristics	Uses	Example	Limitations
National Stanine (NS)	A grouping of percentile ranks.	1–9	<ul style="list-style-type: none">• A stanine of 5 is average; stanines 1–4 are below average; 6–9 are above average.• Equal-interval scale.	To broadly identify areas of strength and weakness.	Lara's stanine of 3 for Reading Total means that she is in the below average stanine group.	Less precise than percentile ranks.

Source: *ITBS/MontCAS Interpretive Guide*



Statewide Assessment Scoring Definitions and Characteristics

Normal Curve Equivalent

NRT Scores	Definition	Score Range	Characteristics	Uses	Example	Limitations
Normal Curve Equivalent (NCE)	Equal- interval scores that result from dividing the normal curve into 99 equal units.	1–99	<ul style="list-style-type: none">• Equal-interval score.• Scores can be added, subtracted, and averaged.	<ul style="list-style-type: none">• To compare tests in terms of strengths and weaknesses.• To compare groups of students.	If Tanya's Reading Total NCE is 46 and her Math Total is 58, you can say that she has a relative weakness in reading and a relative strength in math.	NCEs from different test batteries (e.g., the <i>SAT 9</i> and the <i>ITBS</i>) cannot be interchanged.

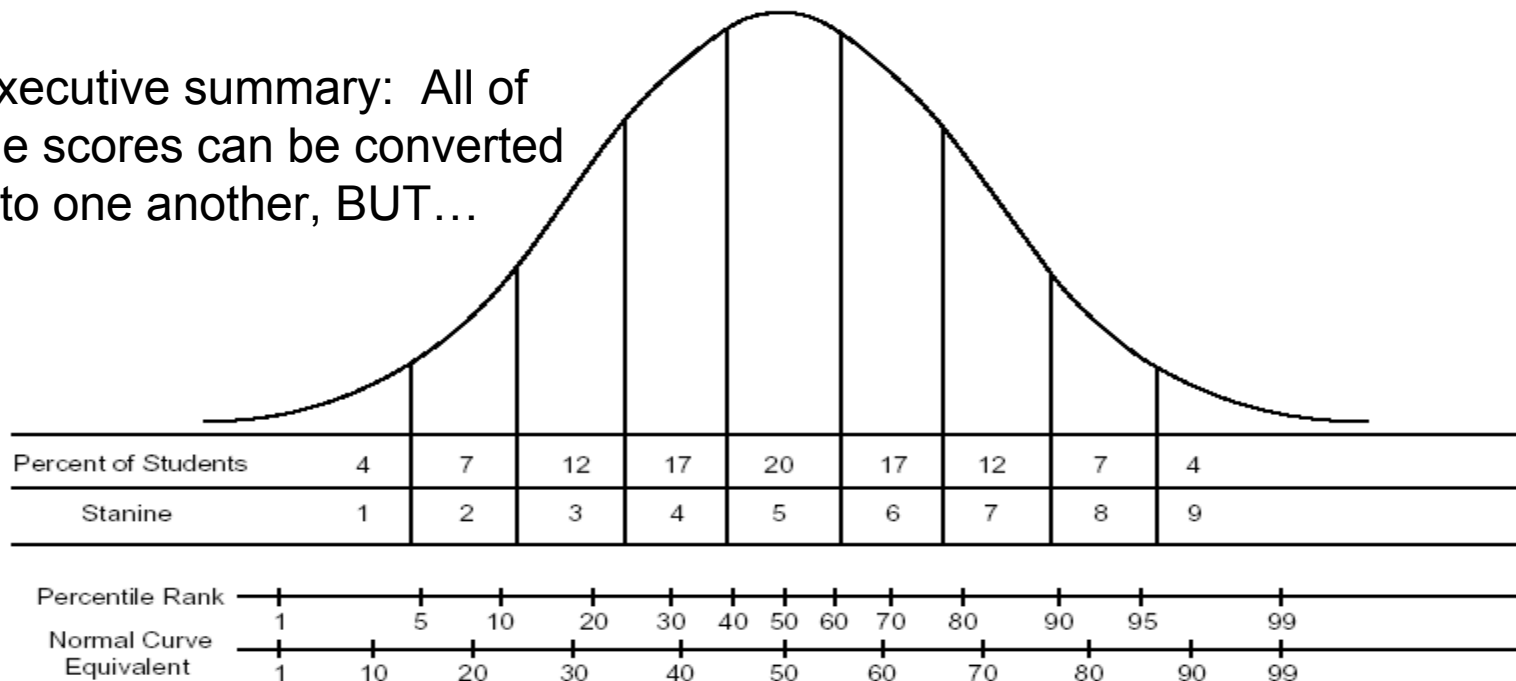
Source: *ITBS/MontCAS Interpretive Guide*



Comparison of Bell Curve Axes

Relationship of Stanines, Percentile Ranks, and Normal Curve Equivalents

Executive summary: All of the scores can be converted into one another, BUT...



...the STANDARD SCORE is the basis of all of them.

Source: *ITBS/MontCAS Interpretive Guide*



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Book Report:
*Data Analysis for Comprehensive
School Improvement*
by Victoria Bernhardt

Major themes in *Data Analysis*



Some Useful Pages

- 11 – Getting started questions
- 15 – The Most Famous Graph in the World
- 26 – Demographic data elements
- 45 – Perception data chart
- 66 – The Normal Curve and its many axes
- 70 – Score conversion tables
- 103 – Learning process flow chart
- 126 – Interactions among data sets



Some Useful Pages

- 144 – Problem-solving cycle diagram
- 149 – Cause and effect brainstorming diagram
- 182 ff. – Chart types for reporting data
- 236 – Questionnaire design flowchart
- 244 – Data collection decision tree
- 277 ff. – Continuous Improvement Continuums



Your Turn:

In five minutes or less, describe a problem in your school you have solved by using information derived from data you collect.



Educational Synectics:

*How is School Improvement
like the Scientific Revolution?*



How is School Improvement like the Scientific Revolution?

- It's a definite break from tradition.
- Uses observation and measurement to find optimum solutions to problems.
- Relies on evidence instead of assumptions.
- Builds a web of interrelated facts into a coherent and testable model of learning.
- It requires the combined efforts of many thoughtful and dedicated people.



How is School Improvement like the Scientific Revolution?

- It paints a radically different view of its environment.
- It can arouse resistance in the old-line "true believers."
- It proceeds from hypothesis to testing to revision to retesting, and so on.
- Literally, *it is the scientific method in action* to give us a better understanding of our world and a chance to make a better world.